Areas of Concern and Future Sampling Needs

This assessment report was designed to summarize the known and potential contamination issues for KNWR. The large size of the refuge makes it virtually impossible to fully assess all potential contamination issues. This investigation documents the major known contamination events, their sources, and potential future contamination issues including: oil and gas development, pesticide use, FUDS, development near the refuge boundaries, mining, waste disposal, recreational uses, fires and fire retardants, inholders, aircraft accidents, biotic sources and physical transport of contaminants. By compiling this information, a better understanding has been gained about contaminant issues that may impact the KNWR and its resources. As a result of this contaminant assessment, some areas of concern, future sampling needs and potentially contaminated areas have been identified.

One of the most interesting and alarming issues that surfaced during this investigation was the presence of contaminants on the refuge that went unnoticed for decades. This issue is disconcerting, and one cannot help but wonder if other contaminant issues still remain undiscovered.

Area of Concern: Unnoticed Contamination Events

One of the most interesting and alarming issues that surfaced during this investigation was the presence of contaminants on the refuge that went unnoticed for decades. This issue is disconcerting, and one cannot help but wonder if other contaminant issues still remain undiscovered. The dates when some of the major known contamination events occurred and when they were actually discovered are presented in Table 3.

Area of Concern: Oil and Gas Development

To date, most of the spills and contamination events that have occurred on the refuge are related to oil and gas activities. In the future, oil and gas activities likely will remain as the greatest potential sources of spills and contamination events for the refuge. New exploration and associated production activities will create additional sites which will require monitoring. Furthermore, the shutdown of the existing oil and gas fields, Swanson River Field and Beaver Creek Field, will be a major contaminant concern as facilities and sites are taken offline.

Future Sampling Needs and Potentially Contaminated Areas

Many contaminant issues went undetected for extended periods of time at Swanson River Field and Beaver Creek Field. These undiscovered contamination events resulted in costly remediation activities. A well-supported contaminant assessment and monitoring program probably would have detected some of these problems earlier, which likely would have saved time and money. Industry may benefit financially by establishing a proactive contaminant assessment and monitoring program that incorporates sampling for contaminants on a periodic basis. The discovery of extensive PCB contamination at SRF in 1984 highlights the importance of systematic contaminant surveys.

Table 3. Major Known Contamination Events: When They Occurred and When They Were Discovered.

Contamination Event	*Occurred*	*Discovered*
Polychlorinated biphenyl contamination at Swanson River Field	August 30, 1968 (unreported fire at the therminol heater building); January 26, 1972 (compressor plant explosion)	1984
Petroleum hydrocarbons and pentachlorophenol contamination at the Skilak "boneyard"	Served as a repository since 1941	1988
Xylene contamination at the Pipe and Supply Yard in Swanson River Field	Early 1970s	1988
Tank farm spill at Beaver Creek Field	Unknown; leak likely had been occurring for several years	1988
Petroleum hydrocarbon contamination at tank settings/flare stack at Swanson River Field	Unknown	1989-1990
Petroleum hydrocarbon contamination at the electric shop and 243-4 mud disposal well pad at Swanson River Field	Unknown	1989-1990
Pentachlorophenol contamination at the Moose Research Center	1960s	1991
Diesel spill at Beaver Creek Field	Unknown; leak likely had been occurring for several years	1991

The refuge also could greatly benefit from more baseline studies, which assess contaminant levels in soil, sediment, water and biota. A paucity of data exists for establishing contaminant baseline levels on the refuge. Baseline data would be helpful in assessing the impacts from potential contaminant sources on and near the refuge. For example, baseline sampling in areas that are likely to see new activities and an increase in existing activities (like oil/gas development) may aid in management decisions and to assess impacts due to future spills and contamination events. These data also could be used to establish the contaminant contribution from off-refuge sources including atmospheric and biotic transport mechanisms. Ideally, contaminant baseline studies would be conducted on all of the National Wildlife Refuges in Alaska, followed by periodic trend monitoring.

Several potentially contaminated areas exist on the KNWR. Some of these areas are documented contaminant sites where cleanup activities have occurred; however, it may be beneficial to conduct additional sampling at these areas to determine if residual contamination is an issue. Other potentially contaminated areas have yet to be examined for contaminants. The following areas/species are recommended for future inspection and/or sampling:

1) A contaminant assessment and monitoring program is recommended for Swanson River Field and Beaver Creek Field. Due to the history of undiscovered contamination events (and known contamination events awaiting remediation), sampling at locations throughout these fields may reveal other contamination issues. Some sampling areas may include the following:
    a) PCB excavation, incineration and disposal sites at SRF (page 12).
    b) Locations where fires and explosions have occurred (pages 28-29).
    c) Former locations of PCB-containing transformers at SRF (page 29).
    d) Former locations of mercury manometers at SRF (pages 29-30).

2) Locations where pesticides such as 2,4-D and 2,4,5-T were used; dioxin contamination could be an issue (page 32).

3) Former Army recreational camp at Skilak Lake (page 35).

4) Naptowne Radio Relay site (pages 35-36).

5) Surprise Creek mining location (pages 44-46).

6) Cooper Creek watershed and the Kenai River downstream from where mining occurred on Cooper Creek (page 47).

7) Anadromous, migratory, and resident species to determine baseline contaminant concentrations and determine if biotic transport of contaminants is a concern (page 59).